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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
MCKANE, ELIZABETH L	

ART UNIT	PAPER NUMBER
1744	

DATE MAILED: 06/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/218,997	FUKAMI, TERUAKI	
	Examiner	Art Unit	
	Leigh McKane	1744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 September 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4,6,8 and 10-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4,6,8 and 10-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Filson et al (U.S. Patent No. 5,518,624) or Asahi (JP 4-83585).

Filson et al teaches high purity water containing Cu in an amount below 0.005 ppb. See Table II, col.15.

Asahi discloses ultra pure water that has been treated to remove all Cu ions. See English Abstract.

As to the intended use of the water, intended use has been continuously held not to be germane to determining the patentability of an invention. *In re Finsterwalder*, 168 USPQ 530.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Filson et al in view of Ohmi et al ("Metallic impurities segregation at the interface between silicon wafer and liquid during wet cleaning").

Filson et al teaches the use of the treated UPW for semiconductor wafer rinsing for contaminant removal. See col.1, lines 13-22. Filson et al does not disclose adding a surfactant to the water. Ohmi et al discloses the use of UPW in wafer rinsing and suggests that the addition of surfactants to the rinse water prevents metallic impurity precipitation on the wafer surface. As Filson et al is concerned with the removal of metallic contaminants from wafer surfaces, it would have been obvious to add a surfactant to the rinse water of Filson et al.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (U.S. Patent No. 5,651,836) in view of Filson et al.

Suzuki teaches "storing" wafers **W** within rinsing tank **1** while contacting them with UPW. Suzuki does not disclose the Cu concentration of the UPW. Filson et al teaches the use of the treated UPW for semiconductor wafer rinsing for contaminant removal. See col.1, lines 13-22. The high purity water of Filson et al contains Cu in an amount below 0.005 ppb. See Table II, col.15. It would have been obvious to employ the UPW of Filson et al in the method of Suzuki because Filson teaches that it is imperative to use water free of all contaminants in semiconductor processing. See col.1, lines 41-50.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki and Filson et al as applied to claim 4 above, and further in view of Prigge et al (U.S. Patent No. 4,973,563).

Suzuki is silent as to whether the wafer has a hydrophobic surface. Prigge et al, however, discloses that treating the wafer to give a hydrophobic surface will prevent it from being wetted and thereby, prevent it from being contaminated by contaminants dispersed in aqueous phases. See col.4, lines 33-37. As Suzuki with Filson et al teaches treating a wafer with in order to remove contaminants therefrom, it would have been obvious to previously treat the wafer to render it hydrophobic so that it would be resistant to contamination.

8. Claims 12, 14, 16, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki and Filson et al as applied to claim 4 above, and further in view of Ilardi et al (U.S. Patent No. 5,466,389)

With respect to claims 12, 16, and 18-20, Suzuki with Filson et al teaches the use of the treated UPW for semiconductor wafer rinsing for contaminant removal. See col.1, lines 13-22. Filson et al does not disclose adding a surfactant chelating agent to the UPW. Ilardi et al discloses cleaning solutions for semiconductor wafers wherein chelating agents like those claimed are employed to retain metals in solution. See col.4, lines 5-20. In addition, surfactants are used to increase the wettability of the wafer surface. As Suzuki and Filson et al are concerned with contaminant (especially metal) removal from wafer surfaces, it would have been obvious to add a chelating agent and surfactant in the manner of Ilardi et al.

As to claim 14, Suzuki with Filson et al teaches the use of the treated UPW for semiconductor wafer rinsing for contaminant removal but does not disclose use of the UPW in an alkaline cleaning solution. Ilardi et al teaches an aqueous alkaline cleaning solution for

cleaning semiconductor wafer surfaces which uses high purity water. See Abstract and col.2, lines 62-64. As the aqueous cleaners of Ilardi et al are free of metal ions, they would have been obvious to use with the UPW of Suzuki with Filson et al in a method of wafer cleaning.

9. Claims 13, 15, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki, Filson et al, and Ilardi et al as applied to claim 12 above, and further in view of Prigge et al.

With respect to claim 13, the combination is silent as to whether the wafer has a hydrophobic surface. Prigge et al, however, discloses that treating the wafer to give a hydrophobic surface will prevent it from being wetted and thereby, prevent it from being contaminated by contaminants dispersed in aqueous phases. See col.4, lines 33-37. As the combination above teaches treating a wafer with in order to remove contaminants therefrom, it would have been obvious to previously treat the wafer to render it hydrophobic so that it would be resistant to contamination.

As to claim 15, Suzuki with Filson et al teaches the use of the treated UPW for semiconductor wafer rinsing for contaminant removal but does not disclose use of the UPW in an alkaline cleaning solution. Ilardi et al teaches an aqueous alkaline cleaning solution for cleaning semiconductor wafer surfaces which uses high purity water. See Abstract and col.2, lines 62-64. As the aqueous cleaners of Ilardi et al are free of metal ions, they would have been obvious to use with the UPW of Suzuki with Filson et al in a method of wafer cleaning.

With respect to claim 17, Suzuki with Filson et al teaches the use of the treated UPW for semiconductor wafer rinsing for contaminant removal. See col.1, lines 13-22. Filson et al does not disclose adding a surfactant chelating agent to the UPW. Ilardi et al

discloses cleaning solutions for semiconductor wafers wherein chelating agents like those claimed are employed to retain metals in solution. See col.4, lines 5-20. In addition, surfactants are used to increase the wettability of the wafer surface. As Suzuki and Filson et al are concerned with contaminant (especially metal) removal from wafer surfaces, it would have been obvious to add a chelating agent and surfactant in the manner of Ilardi et al.

10. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki and Filson et al as applied to claim 4 above, and further in view of Ohmi et al.

Suzuki with Filson et al teaches the use of the treated UPW for semiconductor wafer rinsing for contaminant removal. See col.1, lines 13-22. Filson et al does not disclose adding a surfactant to the water. Ohmi et al discloses the use of UPW in wafer rinsing and suggests that the addition of surfactants to the rinse water prevents metallic impurity precipitation on the wafer surface. As the combination is concerned with the removal of metallic contaminants from wafer surfaces, it would have been obvious to add a surfactant to the rinse water of Filson et al.

11. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki, Filson et al, and Ohmi et al as applied to claim 23 above, and further in view of Prigge et al.

The combination is silent as to whether the wafer has a hydrophobic surface. Prigge et al, however, discloses that treating the wafer to give a hydrophobic surface will prevent it from being wetted and thereby, prevent it from being contaminated by contaminants dispersed in aqueous phases. See col.4, lines 33-37. As the combination above teaches treating a wafer with in order to remove contaminants therefrom, it would have been obvious to previously treat the wafer to render it hydrophobic so that it would be resistant to contamination.

12. Claims 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al (U.S. Patent No. 5,484,748) in view of Filson et al.

Suzuki et al teaches a method of storing a silicon wafer wherein after polishing, the wafer is stored in purified water. See col.2, lines 53-54. Suzuki does not disclose the concentration of Cu in the purified water. Filson et al teaches high purity water containing Cu in an amount below 0.005 ppb. See Table II, col.15. Filson et al teaches the use of the treated UPW for semiconductor wafer rinsing for contaminant removal. See col.1, lines 13-22. As surface contamination of the wafers is a problem addressed by Suzuki et al, it would have been obvious to use the UPW free of contaminants of Filson et al.

13. Claims 6 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al and Filson et al as applied to claim 4 above, and further in view of Prigge et al.

Suzuki et al does not teach a wafer with a hydrophobic surface. Prigge et al, however, discloses that treating (such as by polishing) the wafer to give a hydrophobic surface will prevent it from being wetted and thereby, prevent it from being contaminated by contaminants dispersed in aqueous phases. See col.4, lines 33-37. As the combination above teaches treating a wafer with in order to remove contaminants therefrom, it would have been obvious to previously treat the wafer to render it hydrophobic so that it would be resistant to contamination.

14. Claims 12, 14, 16, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al and Filson et al as applied to claim 4 above, and further in view of Ilardi et al.

With respect to claims 12, 16, and 18-20, Suzuki et al with Filson et al teaches the use of

the treated UPW for semiconductor wafer rinsing for contaminant removal. See col.1, lines 13-22. Filson et al does not disclose adding a surfactant chelating agent to the UPW. Ilardi et al discloses cleaning solutions for semiconductor wafers wherein chelating agents like those claimed are employed to retain metals in solution. See col.4, lines 5-20. In addition, surfactants are used to increase the wettability of the wafer surface. As Suzuki et al and Filson et al are concerned with contaminant (especially metal) removal from wafer surfaces, it would have been obvious to add a chelating agent and surfactant in the manner of Ilardi et al.

As to claim 14, Suzuki et al with Filson et al teaches the use of the treated UPW for semiconductor wafer rinsing for contaminant removal but does not disclose use of the UPW in an alkaline cleaning solution. Ilardi et al teaches an aqueous alkaline cleaning solution for cleaning semiconductor wafer surfaces which uses high purity water. See Abstract and col.2, lines 62-64. As the aqueous cleaners of Ilardi et al are free of metal ions, they would have been obvious to use with the UPW of Suzuki et al with Filson et al in a method of wafer cleaning.

15. Claims 13, 15, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al, Filson et al, and Ilardi et al as applied to claim 12 above, and further in view of Prigge et al.

With respect to claim 13, the combination is silent as to whether the wafer has a hydrophobic surface. Prigge et al, however, discloses that treating the wafer to give a hydrophobic surface will prevent it from being wetted and thereby, prevent it from being contaminated by contaminants dispersed in aqueous phases. See col.4, lines 33-37. As the combination above teaches treating a wafer with in order to remove contaminants therefrom, it

would have been obvious to previously treat the wafer to render it hydrophobic so that it would be resistant to contamination.

As to claim 15, Suzuki et al with Filson et al teaches the use of the treated UPW for semiconductor wafer rinsing for contaminant removal but does not disclose use of the UPW in an alkaline cleaning solution. Ilardi et al teaches an aqueous alkaline cleaning solution for cleaning semiconductor wafer surfaces which uses high purity water. See Abstract and col.2, lines 62-64. As the aqueous cleaners of Ilardi et al are free of metal ions, they would have been obvious to use with the UPW of Suzuki with Filson et al in a method of wafer cleaning.

With respect to claim 17, Suzuki et al with Filson et al teaches the use of the treated UPW for semiconductor wafer rinsing for contaminant removal. See col.1, lines 13-22. Filson et al does not disclose adding a surfactant chelating agent to the UPW. Ilardi et al discloses cleaning solutions for semiconductor wafers wherein chelating agents like those claimed are employed to retain metals in solution. See col.4, lines 5-20. In addition, surfactants are used to increase the wettability of the wafer surface. As Suzuki et al and Filson et al are concerned with contaminant (especially metal) removal from wafer surfaces, it would have been obvious to add a chelating agent and surfactant in the manner of Ilardi et al.

16. Claims 23 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al and Filson et al as applied to claim 4 above, and further in view of Ohmi et al.

Suzuki et al with Filson et al teaches the use of the treated UPW for semiconductor wafer rinsing for contaminant removal after fabrication steps such as polishing. See col.1, lines 13-22. Filson et al does not disclose adding a surfactant to the water. Ohmi et al discloses the use of UPW in wafer rinsing and suggests that the addition of surfactants to the rinse water prevents

metallic impurity precipitation on the wafer surface. As the combination is concerned with the removal of metallic contaminants from wafer surfaces, it would have been obvious to add a surfactant to the rinse water of Filson et al.

17. Claims 24 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al, Filson et al, and Ohmi et al as applied to claim 23 above, and further in view of Prigge et al.

With respect to claim 24, the combination is silent as to whether the wafer has a hydrophobic surface. Prigge et al, however, discloses that treating the wafer to give a hydrophobic surface will prevent it from being wetted and thereby, prevent it from being contaminated by contaminants dispersed in aqueous phases. See col.4, lines 33-37. As the combination above teaches treating a wafer with in order to remove contaminants therefrom, it would have been obvious to previously treat the wafer to render it hydrophobic so that it would be resistant to contamination.

As to claim 11, Suzuki et al discloses that the wafers are stored in the high purity water after fabrication steps such as polishing.

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leigh McKane whose telephone number is 703-305-3387. The examiner can normally be reached on Monday-Wednesday (7:15 am-4:45 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert J. Warden can be reached on 703-308-2920. The fax phone numbers for the

organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Leigh McKane

Leigh McKane
Primary Examiner
Art Unit 1744

elm
June 16, 2003